## REMARKS

OVERVIEW

Claims 1, 3, 4, 21-23, 25, 38-42, 45-47, 49, 50 and 58-64 are pending in the present application. Claims 1, 4, 21, 38, 46, 47, 49, 50, 58, 62, and 63 have been amended. Claim 66 has been cancelled. The present response is an earnest effort to place all claims in proper form for allowance.

OBJECTIONS

The Examiner indicates that in claims 1, 38, and 47, the phrase "a plurality of bits of data" should change to–the digital bits of data—since the phrase "a plurality of bits of data" refers to the digital bits of data. Claims 1, 38, and 47 have been amended for clarity to remove the word "digital." Thus, it is respectfully submitted that this objection has been remedied.

ISSUES UNDER 35 U.S.C. § 112

Claims 1, 3-4, 21-23, 25, 38-42, 45-46, and 58-61 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In particular, the Examiner indicates that the term "characteristics" in claims 1, 21, 38, and 58 is used by the claim to mean "different pulses and/or different pulse shapes and/or different pulse waveforms", while the accepted meaning is "waveforms." The Examiner further indicates that the term is indefinite because the specification does not clearly redefine the term. The Examiner further indicates that one of ordinary skill in the art recognizes that the phrase

"pulse characteristic" refers to three characteristics of a pulse such as amplitude, width, and frequency (Office Action, p. 2, numbered paragraph 3).

This rejection is respectfully traversed. The term "characteristic" should be construed according to its ordinary meaning—no special meaning is intended. The term may also encompass other characteristics including pulse shape. Therefore, it is respectfully submitted that these rejections should be withdrawn.

REJECTIONS UNDER 35 U.S.C. § 102

Claims 1, 3-4, 21-23, 25, 38-40, 42, and 45-46 have been rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,198,783 to Campana, Jr. (hereinafter "Campana"). These rejections are respectfully traversed.

Campana is directed towards a system for wireless serial transmission of encoded information (title). Campana's system appears to be directed towards a method of wirelessly transmitting a waveform involving modulating bits of information at selected parts of each cycle of a plurality of cycles of the waveform (see e.g. claim 1).

Independent claim 1 has been amended and now requires "transmitting the single transmission pulse over a guided medium to a receiver *using pulse modulation* and *without using a carrier signal* to transmit the single transmission pulse" (emphasis added). Campana does not disclose such a limitation. Campana uses a carrier signal as opposed to pulse modulation. It is observed that in col. 24, line 64 to col. 25, line 3, pulse width modulation is mentioned, but such use is with a square wave subcarrier, thus Campana does not disclose "using pulse modulation and without using a carrier signal to transmit the single transmission pulse." See also FIG. 6A. It is further observed that one of ordinary skill in the art would understand that the limitation

"without using a carrier signal" would preclude the use of subcarrier signals, as a subcarrier is merely a type of carrier signal and implies the existence of a main carrier. Therefore, this rejection to claim 1 must be withdrawn. As claims 3-4 depend from claim 1, these rejections must also be withdrawn.

With respect to claim 21, claim 21 requires "transmitting the single transmission pulse without using a carrier signal to transmit the transmission pulse." As Campana uses a subcarrier signal, Campana does not disclose all the limitations of claim 21. As claims 22-23 and 25 depend from claim 21, these rejections should also be withdrawn.

With respect to independent claim 38, claim 38 also includes the limitation of "without using a carrier signal." As Campana uses a subcarrier signal, this rejection should also be withdrawn. As claims 39-40, 42, and 45-46 depend from claim 38, these rejections should also be withdrawn.

Claims 47 and 50 have been rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,926,301 to Hirt. These rejections are respectfully traversed. Hirt is directed towards the optical transmission of wireless signals (Abstract). Hirt uses a pulse modulated data signal, but modulates it with subcarrier signals. Claim 47 explicitly recites "transmitting the single transmission pulse over a transmission medium without using a carrier signal to transmit the single transmission pulse." Hirt does not meet this limitation as Hirt does not disclose "without using a carrier signal to transmit the single transmission pulse." Thus, this rejection to claim 47 must be withdrawn. As claim 50 depends from claim 47, this rejection should also be withdrawn.

Claims 62-64 have been rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 7,027,425 to Fullerton et al. These rejections are respectfully traversed. Claim 62

requires "representing a symbol encoding a plurality of bits of data using a pulse characteristic of a single time modulated ultra wideband radio-frequency pulse." The Examiner indicates that Fullerton et al. makes such a disclosure citing to col. 5, lines 36-50 (Office Action, p. 6). However, although Fullerton there discloses that a single pulse may represent more than one bit, Fullerton does not disclose that a symbol encoding a plurality of bits is represented. Therefore, it is respectfully submitted that this rejection to claim 62 should be withdrawn. As claims 63-64 depend from claim 62, it is respectfully submitted that these rejections should also be withdrawn.

Claim 62 has also been amended to incorporate the limitation of now cancelled claim 65. In particular, claim 62 now recites "wherein the step of representing comprises encoding the plurality of bits into a base 10 representation, such that the single time modulated ultra wideband pulse corresponds to a digit between 0 and 9." As Fullerton does not disclose this limitation, it is respectfully submitted that this rejection to claim 62 should be withdrawn for this independent reason as well.

ISSUES UNDER 35 U.S.C. § 103

Claims 1, 4, 21-23, 25, 38-42, 46-47, and 50 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Rybicki et al. (U.S. Patent Application Publication No. 2001/0055353 A1). These rejections are respectfully traversed.

As the Examiner recognizes, Rybicki et al. does not disclose that the pulse durations include ten separate pulse durations each corresponding to one of the integers 0 through 9 (Office Action, p. 7). However, the Examiner indicates "[I]t would have been obvious to a person of ordinary skill in the art at the time of invention that a pulse width modulation system and method such as the one of Rybicki can generate and transmit ten separate pulses of different durations,

each representing sets of bits respectively, corresponding to one of integers 0 through 9 (such as the ones shown in figs. 4, 5, 9) to provide a high data rate transmission system (Rybicki, page 2, paragraph 0047)." Such an analysis is merely the application of improper hindsight because it does not establish that the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. In fact, it is respectfully submitted that one skilled in the art, would not be lead to represent bits in base 10 for transmission purposes, as such a representation would appear to be merely wasteful of resources in comparison to using a $2^n$ base where $n$ is an integer. Rybicki would further teach away from representing bits in base 10 because Rybicki uses time chips with time slots. As shown in FIG. 4 of Rybicki et al., a single time chip 82 has four time slots 84 which allows for representation of 4 bits of data by the various pulse patterns illustrated in FIG. 4. It is further re-iterated that there is a distinct difference between representing multiple bits of data with a pulse and representing multiple bits of data with a pulse pattern within a time chip, even when the pulse pattern consists of only a single pulse. The time chip and the time slots of time chip provide context beyond the characteristics of a pulse and context which is needed in order to interpret the pulse. For all these reasons, these rejections to claims 1, 4, 21-23, 25, 38-42, 46-47, and 50 should be withdrawn.

Claims 58-64 have rejected under 35 U.S.C. § 103(a) as being unpatentable over McCorkle et al. (U.S. Patent No. 6,700,939). McCorkle et al. is directed towards an ultra wide bandwidth system and discloses that pulse position may be used. Claim 58 requires that the pulse characteristics be selected from a set of at least "ten" pulse characteristics based on the data, thus each pulse may correspond directly to a base 10 symbol. As the Examiner recognizes

(Office Action, p. 10) McCorkle et al. does not disclose such a limitation. Such an analysis is merely the application of improper hindsight because it does not establish that the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. In fact, it is respectfully submitted that one skilled in the art, would not be lead to represent bits in base 10 for transmission purposes, as such a representation would appear to be merely wasteful of resources in comparison to using a $2^n$ base where $n$ is an integer. Therefore it is respectfully submitted that this rejection be withdrawn as well as the rejections to claims 59-61.

In addition, claim 58 has been amended to recite the step of "transmitting the time modulated ultrawideband pulse over a guided medium *from a transmitter* to a receiver." This step is also missing from McCorkle as McCorkle is directed towards a wireless system as opposed to one using a guided medium from a transmitter to a receiver. It is observed that the Examiner had previously indicated with respect to claim 63 that McCorkle disclose transmission over an electrically conductive guided medium, citing to elements 121, 108, 110, 123, 125 of Fig. 1 (Office Action, p. 11), but is respectfully submitted that to the extent McCorkle provides any form a guided medium, it is not "from a transmitter to a receiver" as claimed. Therefore, this rejection to claim 58 should be withdrawn for this independent reason. As claims 59-61 depend from claim 58, these rejections should also be withdrawn.

With respect to independent claim 62, claim 62 has been amended and now recites " over a guided medium from a transmitter to a receiver; wherein the step of representing comprises encoding the plurality of bits into a base 10 representation, such that the single time modulated ultra wideband pulse corresponds to a digit between 0 and 9." It is respectfully submitted that

independent claim 62 is patentable over McCorkle at least for the reasons expressed with respect to claim 58. As claims 63-64 depend from claim 62, it is respectfully submitted that these rejections also be withdrawn.

Claims 58-61 have been rejected as being unpatentable over U.S. Patent No. 7,027,425 to Fullerton in view of U.S. Patent No. 6,546,048 to Ichiba et al. (hereinafter "Ichiba"). It is respectfully submitted that these rejections should be withdrawn. The Examiner recognizes that Fullerton does not disclose

Ichiba is directed towards a pulse width modulation waveform generating circuit. It should be understood that Ichiba forms a pulse width modulation signal for generating $2^n$ kinds of pulses and do so in the context of a digital signal. However, Ichiba does not disclose ultra wideband pulses and claim 58 requires "a single time modulated ultrawideband radio-frequency pulse." Although Fullerton is directed towards ultra wideband, the combination of the two references is only accomplished through improper hindsight. The Examiner indicates "[I]t would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate a method of signal pulse generation such as the one of Ichiba for the signal pulse generation system of Fullerton to generate a plurality of pulses of different durations representing different bits of information to further increase the transmission capacity of the system" (Office Action, p. 12). Time modulation and pulse width modulation are two different types of modulation schemes, the DC pulse width modulated signal of Ichiba and the RF pulse of Fullerton are two very different types of pulses. Because of these differences, one of ordinary skill in the art at the time of the invention would not be led to incorporate a method of signal pulse generation such as the one of Ichiba for the signal pulse generation system of Fullerton to generate a plurality of pulses of different durations representing different bits of information to further increase the transmission

capacity of the system. In part, because extending the duration of a pulse beyond a monocycle would reduce bandwidth. Fullerton recognizes this at col. 4, lines 45-53 stating:

> Waveforms
>
> Impulse radio refers to a radio system based on short, low duty cycle pulses. In the widest bandwidth embodiment, the resulting waveform approaches one cycle per pulse at the center frequency. In more narrow band embodiments, each pulse consists of a burst of cycles usually with some spectral shaping to control the bandwidth to meet desired properties such as out of band emissions or in-band spectral flatness, or time domain peak power or burst off time attenuation.

Thus, when taken as a whole, Fullerton teaches away from the combination proposed by the Examiner, and therefore this rejection should be withdrawn. As claims 59-61 depend from claim 58, these rejections should also be withdrawn.

Claim 49 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application Publication No. 2001/0055353 to Rybicki in view of U.S. Patent No. 6,198,783 to Campana. Claim 49 depend from independent claim 47 which has been distinguished from Rybicki for the reasons previously expressed with respect to claim 47. In particular, Rybicki et al. does not disclose that the pulse durations include ten separate pulse durations each corresponding to one of the integers 0 through 9.

The Examiner relies upon Campana as teaching transmission of information such as characters using pulse width modulation and universal character encoding. The Examiner indicates "it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate a method of universal character encoding in the data transmission system of Rybicki to encode different characters or text for further transmission." The Examiner is again engaging in improper hindsight in making such a leap.

In addition, claim 49 has been amended and now recites "The method of claim 47 wherein the data is in the form of universal character encoding and wherein the plurality of bits

represent a digit associated with a universal character." The rejection to claim 49 is moot in view of this amendment as neither reference alone or in combination discloses such a limitation.

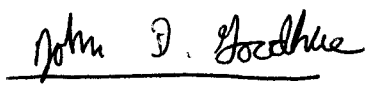
Claim 65 has been rejection under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 6,700,939 to McCorkle et al. in view of U.S. Patent No. 6,198,783 to Campana, Jr. This claim has been cancelled.

CONCLUSION

This amendment accompanies the filing of a request for continued examination (RCE). No other fees or extensions of time are believed to be due in connection with this amendment; however, consider this a request for any extension inadvertently omitted, and charge any additional fees to Deposit Account No. 26-0084.

Reconsideration and allowance is respectfully requested.

Respectfully submitted,



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